

## **ORIGINAL ARTICLE**

### **Necrotizing fasciitis in a plastic surgery unit: a report of ten patients from Ilorin**

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#### **Abstract**

**Background:** Diffuse necrotizing fasciitis is the most treacherous soft tissue infection particularly because it may masquerade as simple cellulitis, thereby delaying diagnosis and treatment. Necrotizing fasciitis correspond to deeper burns and require resuscitation, early debridement and skin coverage. It runs a rapid clinical course.

**Method:** Ten patients with necrotizing fasciitis were managed in the division of plastic and reconstructive surgery at the University of Ilorin Teaching Hospital, Nigeria. The hospital records of these patients were reviewed and form the basis of this report.

**Result:** The duration of symptoms ranged between one day and three weeks. Most patients presented with associated high grade fever and rigor. Four of the patients had pre-morbid state which could have predisposed them to the infection. They were managed with intravenous fluids, antibiotics and analgesics, most patients had extensive debridement with subsequent wound dressing before skin grafting. Five patients survived while the remaining five died with a crude mortality of 50%.

**Conclusion:** Early diagnosis, aggressive surgical intervention combined with supportive therapy is crucial to the successful treatment of the disease. If we must reduce the high mortality rate of the condition in our sub-region, early referral to a burns team should be considered as a treatment option by clinicians dealing with such cases.

**Key word:** necrotizing fasciitis, mortality, plastic surgery

#### **Introduction**

Diffuse necrotizing fasciitis is the most treacherous soft tissue infection particularly because it may masquerade as simple cellulitis, thereby delaying diagnosis and treatment. It is a severe life threatening infection that is characterized by rapidly spreading necrosis of fascia, subcutaneous tissue, skin and even muscle when treatment is delayed.<sup>1, 2</sup> Maloney reporting from China, published the first comprehensive series of 20 cases.<sup>3</sup> Wilson suggested the name necrotizing fasciitis because of the characteristic fascia necrosis observed amongst the cases.<sup>4</sup> Necrotizing fasciitis is seen more commonly in the debilitated patient and is associated with significant morbidity and mortality.<sup>5</sup> Although in a few cases there may be no obvious cause, most are preceded by a history of trauma that may be as trivial as an insect bite, hypodermic injection and non-steroidal anti-inflammatory drug (NSAID) and post operative wound.<sup>6</sup>

It runs a rapid clinical course. Extreme degree of prostration and tachycardia out of proportion to the temperature elevation are characteristic and anaemia often accompanied the condition<sup>7</sup>. They require the combination of aggressive medical therapy and specialised skin care with extensive debridement and reconstruction. Skin grafting is often needed. This is a report of the experience in a Burns unit in Ilorin, Nigeria.

#### **Materials and Methods**

In the period between March 2001 and March 2002, ten patients with diagnosed necrotizing fasciitis were managed at the University of Ilorin Teaching Hospital, Ilorin, Nigeria in the division of Plastic and Reconstructive surgery. Some of these patients were initially treated by the general surgery unit, paediatric surgery unit and the paediatric medical unit before been referred to our unit. The hospital records of these patients were reviewed and form the basis of this report.

## Results

The features in the ten patients are summarised in Table 1. The age range of the patient was 18days to 67years. There were seven males and three females.

### Symptomatology

The duration of symptoms ranges between one day and three weeks. Most patients presented with fever, mostly high grade with associated rigor. There was history of pain and swelling in the region of the body affected by most of the patient, so a diagnosis of cellulitis was made in the majority of cases. The 18-day old baby presented with multiple septic spots over the posterior trunk and a diagnosis of staphylococcus skin infection was made. That patient was then sent to the paediatric medical unit. Baby later developed left axillary contracture from the wounds managed in the paediatric ward which was released and grafted.

A patient with morbid obesity was already diagnosed as a case of gangrene of the lower limb by the casualty officer because of the extensive necrosis of the skin. Most of the patients had history of one form of trauma precipitating the infection. These range from a minor trauma to the leg to a human bite of the hand. Four of the patients had a pre-morbid state which could have predisposed them to the infection. One was a known Diabetic Mellitus patient while the other was diagnosed when the blood sugar was taken before surgical debridement was undertaken. One patient had protein-energy malnutrition. Wound swabs for microscopy, culture and sensitivity were also done for majority of the patients.

### Microbiology

Wound swabs for microscopy, aerobic culture and sensitivity was obtained from six patients. Organisms cultured were mainly gram negative aerobic bacilli. Most of the wound grew Klebsiella species, Proteus species, Escherichia coli and pseudomonas. Staphylococcus aureus was cultured in one of the patient.

### Treatment

Most of the patients presented with acute clinical conditions like fever, chills and rigor and pain. They were managed with intravenous fluids, antibiotics (mostly ciprofloxacin and metronidazole) and analgesics. Most patients had extensive debridement with subsequent wound dressing before skin grafting. Examples are as shown in the clinical photographs. One patient had intramuscular injection leaving an extensive gluteal wound following debridement. Another 12-year old patient developed rapidly progressive necrotizing fasciitis and stopped breathing while been taken to the operating theatre for emergency wound debridement.

### Hospital stay

For the patients that survived, the duration of hospital stay ranges from six weeks to fourteen weeks (mean eleven weeks). After surgical debridement, wound

dressings were done until the wound has granulated and clean enough for skin grafting. For the patient that died, their range of hospital stay was between 7hours to 72hours.

### Outcome

Five patients survived while the remaining five died with a crude mortality of 50%. Three of the patients died within 12hours after surgical debridement. The fourth patient died while awaiting surgical procedure, while the fifth patient died on the way to the operating theatre for emergency wound debridement.

## Discussion

Patients who are critically ill and have large areas of skin loss or breakdown present a management problem.<sup>8</sup> They require the combination of aggressive medical therapy and specialized care usually with extensive debridement and reconstruction. During the acute treatment of a thermally injured patient, there is a requirement for intensive care skills, aggressive surgery and meticulous wound care. This is followed by early rehabilitation with input from physiotherapists, occupational therapists and social workers. Non burn conditions like necrotizing fasciitis and toxic epidermal necrolysis present the same challenges as thermal injuries and require similar treatment.<sup>9, 10</sup>

Necrotizing fasciitis correspond to deeper burns and require resuscitation, early debridement and skin coverage.<sup>11</sup> It runs a rapid clinical course. The localized necrosis of the skin is due to thrombosis of the nutrient vessels. The infection then dissects along fascial layers, often involving subcutaneous tissue, with extensive undermining of surrounding structures. Muscles, bones and other deep tissues are not usually primarily involved. In the pre antibiotic era, the mortality rate of this disease was very high. Figures went as high as 76%.<sup>12</sup> With the introduction of antibiotics and advances in health care delivery facilities, there was a fall in the mortality rate of 30-40%.<sup>13</sup>

The crude mortality rate in the cases we are reporting was 50%, this was quite high. We are not aware of any local studies to compare this mortality with. Most of our patients presented late to the hospital (between 1-3 weeks) and even at presentation, the diagnoses were missed in most cases. Diagnoses of cellulitis were freely made by the casualty officers and patients were commenced on antibiotics and bed rest only. Diagnosis of ischio-rectal abscess was made on one particular patient and the patient was booked for incision and drainage only to discover necrosis of the perineum and scrotal region during the operative procedure. Most of our patients had history of one form of trauma precipitating the infection. This tallies with the study conducted by Pillans<sup>6</sup> et al. Necrotising fasciitis is said to be common in the debilitated patient and is associated with high morbidity and mortality.

Table 1: Summary of features in 10 patients with necrotising fasciitis

Patient	Age (years)	Sex	Duration of symptoms (days)	Symptoms	Precipitating factor	Re-nutritid state	Organism culture	Treatment	Hospital stay	Outcome
1	67	M	7	Fever, pain in the buttock	Intramuscular injection	-	Klebsiella, Proteus, Staphylococcus aureus	Extensive debridement, antibiotics, in-fluid antibiotics, in-fluid analgesic, in-fluid, extensive debridement	14weeks	Survived
2	32	M	5	leg swelling, leg pain, fever, leg ulcer	Minor trauma	Marbid obesity	Klebsiella, Proteus, Escherichia Coli	Antibiotics, analgesic, in-fluid, extensive debridement	12weeks	Survived
3	17½	F	21	swollen left arm/back, fever	Malnutrition	-	Pseudomonas, Klebsiella	in-fluid, antibiotics, debridement	6weeks	Survived
4	18 days	F	7	fever, skin rash	? skin infection	-	Klebsiella, Escherichia Coli	Release of contracture	12weeks	Survived
5	54	M	3	pain around the scapular region, fever	None	Diabetes mellitus	Pseudomonas, Klebsiella	Extensive debridement	48hours	Dead
6	35	F	3	swelling of the right fore arm, fever	Human bite	Diabetes mellitus	Klebsiella, Proteus, Pseudomonas	in-fluid, antibiotic	72hours	Died
7	58	M	14	pain, swelling in the foot, fever	Minor trauma	None	None	in-fluid, antibiotics, extensive debridement	24hours	Died
8	34	M	7	pain in the perineal region, fever	Bite in the perineum	None	None	in-fluid, antibiotics, extensive debridement	72hours	Died
9	50	M	6	painful swelling in the left groin/fore, fever, rigor, spread to the leg	-	-	Klebsiella, Proteus	in-fluid antibiotic, extensive debridement	10weeks	Survived
10	12	M	1	partial swelling in the left buttock/thigh, rapid progression, fever	-	-	Staphylococcus aureus	in-fluid, antibiotic, analgesic	7hours	Died

Table 1: Necrotising fasciitis in a burns unit

Two of our patients had diabetes mellitus, one was obese and another one had protein energy malnutrition. Several reports of necrotizing fasciitis has implicated  $\beta$ -haemolytic group A streptococci as the primary pathogens.<sup>14</sup> The described group A streptococcal necrotizing fasciitis with associated toxic shock is said to occur typically in healthy young subjects. However, majority of cases represent a mixed synergistic infection involving both aerobes and obligate anaerobes. Organisms cultured in our patients were mainly gram negative aerobic bacilli such as *Klebsiella* species, *Proteus* species, *Escherichia coli* and *Pseudomonas*.

Most of our patients presented with acute clinical conditions such as high grade fever, chills and rigors, tachycardia and pain. They were managed with medical therapy, none had intensive therapy support. Extensive debridement resulted in large surface wound in most cases. These wounds were dressed for some weeks before they were clean enough for skin grafting. The extent of patients' wounds and the size of the dressing changes can be difficult for usual general nursing staff to cope with. Nurses who are familiar with burn wound dressings are the most suitable staff to deal with these complex wounds. Delay before a correct diagnosis was made as well as late presentation to the hospital contributed to high mortality. It is said that for necrotizing fasciitis, if a regimen of early debridement and skin coverage is followed, and then mortality can be as low as 4%.<sup>11</sup> If therapy is delayed or the debridement is inadequate, then mortality can be as high as 38%.<sup>11</sup>

The earliest clinical clues to recognition of diffuse necrotizing infections are oedema out of proportion to skin erythema, gas in the subcutaneous tissues that may be identified as clinical crepitus and the presence of vesicles. If the early signs are missed, local skin anaesthesia and necrosis occur and systemic progression may present as fever resistant to antibiotic therapy and or hypotension. These findings should provoke prompt surgical exploration and administration of broad spectrum antibiotic therapy. Doctors that first see these patients must take note of these diffuse clinical presentations. Early diagnosis, aggressive surgical intervention combined with supportive therapy is crucial to the successful treatment of the disease. Supportive treatment should be aimed at correcting hypovolaemia and systemic toxicity.<sup>14</sup> The underlying systemic condition must also be adequately treated. Skin grafting is often required after resuscitation and debridement.

Plastic surgery unit is the most suitable environment to manage these patients<sup>8</sup>. The team is used to dealing with critically ill patients who need intensive care support. They are also well practiced in taking such patients to operating theatre and carrying

out quick, aggressive debridement and skin grafting. If we must reduce the high mortality rate of this condition in our sub-region, early referral to a burns team should be considered as a treatment option by clinicians dealing with such cases.

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